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09/498,012	02/04/2000	Craig M. Jarchow	APA-001	8206

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EXAMINER	
DAY, HERNG DER	
ART UNIT	PAPER NUMBER
2128	7

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	**Application No.** 09/498,012	**Applicant(s)** JARCHOW, CRAIG M.	
	Examiner Herng-der Day	**Art Unit** 2128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 January 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *08 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

1. This communication is in response to Applicant's Reply (paper # 6) to Office Action dated March 26, 2003 (paper # 4), faxed January 15, 2004, and resubmitted March 3, 2004, received by PTO March 8, 2004.

1-1. Claims 1, 2, 5, 8, 10, 15, 18, and 21 have been amended; claims 1-25 are pending.

1-2. Claims 1-25 have been examined and rejected.

Drawings

2. The proposed drawing corrections to Figures 1, 2, and 4 and the formal drawings were received on March 8, 2004. These drawings are acceptable. The objection to the drawings has been withdrawn.

Specification

3. The disclosure is objected to because of the following informalities:

3-1. It appears that the legend of equation 1, as described in lines 7-10 of page 2, is not consistent. The amendment to the specification as described in page 3 of paper # 6 fails to make it consistent. Appropriate correction is required.

Claim Objections

4. Claim 15 is objected to because there is no period to end the claim. Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claims 4 and 7 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

6-1. For example, claim 4 recites the limitation "generating a substantially horizontal cross-section of said seismic data to depict the location of thin beds". However, as recited in claim 2, "the seismic display represents the frequency having the greatest amplitude within each said frequency spectrum". In other words, each and every window will be represented by the "determined frequency" in the "seismic display" even a thin bed does not necessarily exist. Furthermore, as described in lines 22-24 of page 14, "It is also contemplated that the frequency spectra calculated in step 32 may be utilized to provide data regarding the presence of thin beds without performing steps 34, 36 and 38". However, no further detail has been disclosed on how to utilize the frequency spectra to provide data regarding the presence of thin beds. Therefore, without undue experimentation, it is unclear for one skilled in the art how "to depict the location of thin beds" unless a thin bed is located in each and every seismic data window.

6-2. For example, claim 7 recites the limitation "generating a substantially horizontal cross-section of said seismic data to depict the location of thin beds". However, as recited in claim 5,

"the seismic display represents said amplitudes" and every amplitude is determined "within each said frequency spectrum". In other words, each and every window will be represented by the "determined amplitude" in the "seismic display" even a thin bed does not necessarily exist. Therefore, without undue experimentation, it is unclear for one skilled in the art how "to depict the location of thin beds" unless a thin bed is located in each and every seismic data window.

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 1-20, 22 and 24-25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

8-1. For example, claim 1 recites the added limitation "determining the frequency having the greatest amplitude within the frequency spectrum of the seismic data within said successively selected windows" and "utilizing said determined frequencies having the greatest amplitude to generate a thin bed seismic display". In other words, "a thin bed seismic display" will be generated by "utilizing said determined frequencies" which will be determined "within said successively selected windows". However, in reality, a thin bed does not necessarily exist within each and every successively selected window. Accordingly, the claimed "a thin bed seismic display" is vague and indefinite because the "determined frequencies having the greatest amplitude" do not necessarily have anything to do with the "thin bed" unless anything displayed by the "seismic display" and generated by the "determined frequencies" is interpreted as a location of a "thin bed".

Furthermore, claims 15, 18, and 24 similarly recite the added limitation "a thin bed seismic display" which is vague and indefinite. Although it does display something for each and every successively selected window, it is unclear whether the "thin bed seismic display" may have anything to do with the "thin bed" unless anything displayed by the "seismic display" and generated by the "determined frequencies or amplitudes" is interpreted as a location of a "thin bed".

8-2. Claims 3, 6, 11, 16, 19, and 22 recite the limitation "said data" in line 1 of each claim. There is insufficient antecedent basis for this limitation in each claim.

8-3. Claims not specifically rejected above are rejected as being dependent on a rejected claim.

Claim Interpretation

9. Independent claims 1, 15, 18, and 24 recite the limitation "a thin bed seismic display" in each claim. Although Applicant asserts using "a commercially available visualization software package" to generate displays as described in lines 1-2 of page 15, the "thin bed seismic display" is vague and indefinite because it is unclear whether the "seismic display" may have anything to do with the "thin bed". Nevertheless, it does display something for each and every successively selected window, as discussed in section **8-1** above. For the purpose of claim examination with the broadest reasonable interpretation, the Examiner will interpret anything displayed by the "thin bed seismic display" and generated by the "determined frequencies or amplitudes" as a location of a "thin bed".

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. Claims 1-7, 13-20, and 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's assertion and Partyka et al., U.S. Patent 6,131,071 issued October 10, 2000, and filed January 19, 1999, in view of Cox et al., "Maximum Entropy Analysis of Dispersed Seismic Signals", Geophysics, Vol. 51, No. 12, December 1986, pages 2225-2234.

11-1. Regarding claims 1 and 13-14, Partyka et al. disclose a method of processing a group of spatially related seismic data traces (abstract; and summary, column 7, line 9, through column 11, line 7), comprising:

defining seismic data windows extending over selected portions of said group of spatially related seismic data traces (transform window, column 17, lines 36-57);

generating a frequency spectrum of the seismic data within successively selected windows of said seismic data traces by applying a transform to said successively selected windows (discrete Fourier transform, column 7, lines 10-13);

determining the frequency having the greatest amplitude within the frequency spectrum of the seismic data within said successively selected windows (location of maximum frequency, column 31, lines 54-57; and Fig. 14); and

utilizing said determined frequencies having the greatest amplitude to generate a thin bed seismic display in which horizontal dimension represents distance and vertical dimension

represents time (to image and map the extent of thin beds, column 7, lines 10-13; a commercially available visualization software package, Applicant's assertion, lines 1-2, page 15).

Partyka et al. fail to expressly disclose the transform having poles on the unit z-circle, where z is the z-transform. Nevertheless, Partyka et al. suggest that a wide variety of discrete data transformations other than the Fourier (column 38, lines 13-24) can be used to identify thin bed effects.

Cox et al. disclose "maximum entropy power spectral analysis eliminates the resolution constraints imposed by convolution of window's Fourier transform with the spectrum of the trace segment" (Cox, page 2225, column 2, paragraph 3). In other words, using maximum entropy method will enhance the resolution of a moving-window analyzer. Specifically, Cox et al. disclose the missing element that the transform having poles on the unit z-circle, where z is the z-transform.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Partyka et al. to incorporate the teachings of Cox et al. to obtain the invention as specified in claims 1 and 13-14 because by using maximum entropy method to replace Fourier transform, the resolution of a moving-window analyzer will be enhanced (Cox, abstract).

11-2. Regarding claims 2-7, Partyka et al. disclose the construction of a 3-D volume and the calculation of various seismic attributes, including location of maximum frequency and the amplitude at the maximum frequency (column 31, line 17, through column 32, line 56), which meet all the claimed limitations. Please refer to claim interpretation as detailed in section **9** above.

11-3. Regarding claim 15, Partyka et al. disclose a method of processing a group of spatially related seismic data traces (abstract; and summary, column 7, line 9, through column 11, line 7), comprising:

defining seismic data windows extending over selected portions of said group of spatially related seismic data traces (transform window, column 17, lines 36-57);

generating a frequency spectrum of the seismic data within successively selected windows of said seismic data traces by applying a transform to said successively selected windows (discrete Fourier transform, column 7, lines 10-13);

determining the frequency value of the frequency component having the greatest amplitude within each said frequency spectrum (location of maximum frequency, column 31, lines 54-57; and Fig. 14); and

utilizing said determined frequency values to generate a thin bed seismic display in which horizontal dimension represents distance and vertical dimension represents time (to image and map the extent of thin beds, column 7, lines 10-13; a commercially available visualization software package, Applicant's assertion, lines 1-2, page 15).

Partyka et al. fail to expressly disclose applying a maximum entropy transform to said successively selected windows. Nevertheless, Partyka et al. suggest that a wide variety of discrete data transformations other than the Fourier (column 38, lines 13-24) can be used to identify thin bed effects.

Cox et al. disclose "maximum entropy power spectral analysis eliminates the resolution constraints imposed by convolution of window's Fourier transform with the spectrum of the trace segment" (Cox, page 2225, column 2, paragraph 3). In other words, using maximum

entropy method will enhance the resolution of a moving-window analyzer. Specifically, Cox et al. disclose the missing element of applying a maximum entropy transform to said successively selected windows.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Partyka et al. to incorporate the teachings of Cox et al. to obtain the invention as specified in claim 15 because by using maximum entropy method to replace Fourier transform, the resolution of a moving-window analyzer will be enhanced (Cox, abstract).

11-4. Regarding claim 16, Partyka et al. further disclose a substantially horizontal cross-section of a three-dimensional volume of seismic data (Fig. 14; 3-D volume, column 31, lines 29-52).

11-5. Regarding claim 17, Partyka et al. further disclose said method is implemented on a digital computer and comprises all limitation steps as shown in Fig. 8 and Fig. 14 except that Partyka et al. fail to expressly disclose calculating coefficients for the maximum entropy transform. Nevertheless, Partyka et al. suggest that a wide variety of discrete data transformations other than the Fourier (column 38, lines 13-24) can be used to identify thin bed effects.

Cox et al. disclose "maximum entropy power spectral analysis eliminates the resolution constraints imposed by convolution of window's Fourier transform with the spectrum of the trace segment" (Cox, page 2225, column 2, paragraph 3). In other words, using maximum entropy method will enhance the resolution of a moving-window analyzer.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Partyka et al. to incorporate the teachings of Cox et al. to

obtain the invention as specified in claim 17 because by using maximum entropy method to replace Fourier transform, the resolution of a moving-window analyzer will be enhanced (Cox, abstract).

11-6. Regarding claim 18, Partyka et al. disclose a method of processing a group of spatially related seismic data traces (abstract; and summary, column 7, line 9, through column 11, line 7), comprising:

defining seismic data windows extending over selected portions of said group of spatially related seismic data traces (transform window, column 17, lines 36-57);

generating a frequency spectrum of the seismic data within successively selected windows of said seismic data traces by applying a transform to said successively selected windows (discrete Fourier transform, column 7, lines 10-13);

determining the greatest amplitude of the frequency components within each said frequency spectrum (the amplitude at the maximum frequency, column 31, lines 57-59); and

utilizing said amplitudes to generate a thin bed seismic display in which the horizontal dimension represents distance and the vertical dimension represents time (to image and map the extent of thin beds, column 7, lines 10-13; a commercially available visualization software package, Applicant's assertion, lines 1-2, page 15).

Partyka et al. fail to expressly disclose applying a maximum entropy transform to said successively selected windows. Nevertheless, Partyka et al. suggest that a wide variety of discrete data transformations other than the Fourier (column 38, lines 13-24) can be used to identify thin bed effects.

Cox et al. disclose "maximum entropy power spectral analysis eliminates the resolution constraints imposed by convolution of window's Fourier transform with the spectrum of the trace segment" (Cox, page 2225, column 2, paragraph 3). In other words, using maximum entropy method will enhance the resolution of a moving-window analyzer. Specifically, Cox et al. disclose the missing element of applying a maximum entropy transform to said successively selected windows.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Partyka et al. to incorporate the teachings of Cox et al. to obtain the invention as specified in claim 18 because by using maximum entropy method to replace Fourier transform, the resolution of a moving-window analyzer will be enhanced (Cox, abstract).

11-7. Regarding claim 19, Partyka et al. further disclose a substantially horizontal cross-section of a three-dimensional volume of seismic data (3-D volume, column 31, lines 29-52).

11-8. Regarding claim 20, Partyka et al. further disclose said method is implemented on a digital computer and comprises all limitation steps as shown in Fig. 8 and in column 31, lines 57-59 except that Partyka et al. fail to expressly disclose calculating coefficients for the maximum entropy transform. Nevertheless, Partyka et al. suggest that a wide variety of discrete data transformations other than the Fourier (column 38, lines 13-24) can be used to identify thin bed effects.

Cox et al. disclose "maximum entropy power spectral analysis eliminates the resolution constraints imposed by convolution of window's Fourier transform with the spectrum of the

trace segment" (Cox, page 2225, column 2, paragraph 3). In other words, using maximum entropy method will enhance the resolution of a moving-window analyzer.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Partyka et al. to incorporate the teachings of Cox et al. to obtain the invention as specified in claim 20 because by using maximum entropy method to replace Fourier transform, the resolution of a moving-window analyzer will be enhanced (Cox, abstract).

11-9. Regarding claim 24, this device claim performs the process of claim 1 and is unpatentable using the same analysis of claim 1.

11-10. Regarding claim 25, Partyka et al. further disclose said device is selected from the group consisting of a magnetic tape, a magnetic disk, and an optical disk (by using a magnetic disk, by type, by optical disk, column 16, lines 15-20).

12. Claims 8-12 and 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's assertion and the combined teachings of Partyka et al., U.S. Patent 6,131,071 issued October 10, 2000, and filed January 19, 1999, and Cox et al., "Maximum Entropy Analysis of Dispersed Seismic Signals", Geophysics, Vol. 51, No. 12, December 1986, pages 2225-2234, and further in view of Kern et al., U.S. Patent 4,665,390 issued May 12, 1987.

12-1. Regarding claims 8-10, Partyka et al. further disclose utilizing the frequency having the greatest amplitude to calculate bed thickness (the tuning thickness depends only on the dominant wavelength of the wavelet, column 6, lines 24-28; standard formula, known to those of ordinary skill in the art, Applicant's assertion, lines 20-23, page 13). The seismic display represents bed thickness (to image and map the extent of thin beds, column 7, lines 10-13; a commercially

available visualization software package, Applicant's assertion, lines 1-2, page 15). However, Partyka et al. fail to expressly disclose determining whether the peakedness or kurtosis of said frequency spectrum exceeds a selected value.

Kern et al. disclose "Statistical discriminators for fire sensing may be combined with other types of sensors operating in the frequency domain for developing improved sensitivity with better security against false alarms" and "determines … the Kurtosis of sampled data in statistical analysis to discriminate between fires and non-fires" (abstract). Specifically, "kurtosis is a measure of how the collection of data is concentrated about its mean" (Kern, column 3, lines 50-53) and "For example, a waveform with a few large, narrow peaks, but most of its information concentrated near zero, could have a large kurtosis due to the fourth power effect of the large peaks" (Kern, column 6, lines 45-48). In other words, Kern et al. disclose techniques to measure the randomness of sampled data and use the Kurtosis of sampled data in statistical analysis for developing improved sensitivity with better security against false alarms.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the combined teachings of Partyka et al. and Cox et al. to incorporate the teachings of Kern et al. to obtain the invention as specified in claims 8-10 because to calculate bed thickness only when the kurtosis of said frequency spectrum exceeds a selected value will develop improved sensitivity in statistical analysis to discriminate the existence of thin beds.

12-2. Regarding claim 11, Partyka et al. further disclose a three-dimensional volume of seismic data (3-D volume, column 31, lines 29-52).

12-3. Regarding claim 12, Partyka et al. further disclose generating a substantially vertical cross-section of said seismic data to depict the location of thin beds (to image and map the extent

of thin beds, column 7, lines 10-13; a commercially available visualization software package, Applicant's assertion, lines 1-2, page 15).

12-4. Regarding claim 21, Applicant's assertion and the combined teachings of Partyka et al. and Cox et al. meet all the claimed limitations except (1) calculating kurtosis; (2) determining if the kurtosis of each said frequency spectrum exceeds a selected value of kurtosis; and (3) calculating bed thickness if the kurtosis value exceeds a selected value.

Kern et al. disclose "Statistical discriminators for fire sensing may be combined with other types of sensors operating in the frequency domain for developing improved sensitivity with better security against false alarms" and "determines ... the Kurtosis of sampled data in statistical analysis to discriminate between fires and non-fires" (abstract). Specifically, "kurtosis is a measure of how the collection of data is concentrated about its mean" (Kern, column 3, lines 50-53) and "For example, a waveform with a few large, narrow peaks, but most of its information concentrated near zero, could have a large kurtosis due to the fourth power effect of the large peaks" (Kern, column 6, lines 45-48). In other words, Kern et al. disclose techniques to measure the randomness of sampled data and use the Kurtosis of sampled data in statistical analysis for developing improved sensitivity with better security against false alarms.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the combined teachings of Partyka et al. and Cox et al. to incorporate the teachings of Kern et al. to obtain the invention as specified in claim 21 because to calculate bed thickness only when the kurtosis of said frequency spectrum exceeds a selected value will develop improved sensitivity in statistical analysis to discriminate the existence of thin beds.

12-5. Regarding claim 22, Partyka et al. further disclose that said data related to the location of thin beds comprises a substantially vertical cross-section of a three-dimensional volume of seismic data (3-D volume, column 31, lines 29-52).

12-6. Regarding claim 23, the combined teachings of Partyka et al. and Cox et al. meet all the claimed limitations as shown in Fig. 8 and Fig. 14, except (1) calculating kurtosis; (2) determining whether said calculated kurtosis exceeds a preselected kurtosis value.

Kern et al. disclose "Statistical discriminators for fire sensing may be combined with other types of sensors operating in the frequency domain for developing improved sensitivity with better security against false alarms" and "determines ... the Kurtosis of sampled data in statistical analysis to discriminate between fires and non-fires" (abstract). Specifically, "kurtosis is a measure of how the collection of data is concentrated about its mean" (Kern, column 3, lines 50-53) and "For example, a waveform with a few large, narrow peaks, but most of its information concentrated near zero, could have a large kurtosis due to the fourth power effect of the large peaks" (Kern, column 6, lines 45-48). In other words, Kern et al. disclose techniques to measure the randomness of sampled data and use the Kurtosis of sampled data in statistical analysis for developing improved sensitivity with better security against false alarms.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the combined teachings of Partyka et al. and Cox et al. to incorporate the teachings of Kern et al. to obtain the invention as specified in claim 23 because to calculate bed thickness only when the kurtosis of said frequency spectrum exceeds a selected value will develop improved sensitivity in statistical analysis to discriminate the existence of thin beds.

Applicants' Arguments

13. Applicant argues the following:

(1) "there is no teaching or suggestion in Partyka for using the maximum frequency or the amplitude at the maximum frequency in an investigation of thin beds" (page 13, first paragraph, paper # 6).

(2) "Of all the attributes mentioned which it is said could be calculated, only the "change of spectral amplitude or phase with frequency" is mentioned as being useful in connection with an investigation of thin beds" (page 14, first full paragraph, paper # 6).

(3) In the disclosure of Partyka et al., "There are no teachings or suggestions of applicant's invention, for example, as claimed in claim 1, of" two newly added limitations (page 14, first full paragraph, paper # 6).

(4) In claim 2 the seismic display represents the frequency having the greatest amplitude within each said frequency spectrum and in claim 5 the seismic display represents the amplitude of the frequency having the greatest amplitude (page 14, last paragraph, paper # 6).

(5) "Claims 8 and 10 claim the embodiment of the invention in which the frequency having the greatest amplitude is used to calculate the bed thickness and the seismic display generated according to the present invention represents bed thickness (page 15, first paragraph, paper # 6).

Response to Arguments

14. Applicant's arguments have been fully considered.

14-1. Applicant's arguments (1) - (2) are unpersuasive. Partyka's patent is "directed generally toward a method of processing seismic data to provide improved quantification and visualization of subtle seismic thin bed tuning effects and other sorts of lateral rock discontinuities (Abstract, first paragraph). "After processing the seismic traces within the zone of interest, each tuning cube may be individually examined for evidence of thin bed effects" (column 24, lines 24-26). In other words, all the tuning cubes discussed in Partyka's patent including FIG. 14, which is a peak frequency tuning cube, are individually examined for evidence of thin bed effects as suggested by Partyka et al.

14-2. Applicant's argument (3) is unpersuasive. The step of "determining the frequency having the greatest amplitude within the frequency spectrum of the seismic data within said successively selected windows" has been disclosed as "location of maximum frequency" in column 31, lines 54-57 and Fig. 14. The step of "utilizing said determined frequencies having the greatest amplitude to generate a thin bed seismic display in which horizontal dimension represents distance and vertical dimension represents time" can be accomplished without teaching by, at least, using a commercially available visualization software package as asserted by Applicant in lines 1-2, page 15 of the specification.

14-3. Applicant's argument (4) is unpersuasive. Partyka et al. have disclosed determining "the frequency having the greatest amplitude within each said frequency spectrum" and "the amplitude of the frequency having the greatest amplitude" in column 31, lines 54-59. To display it, a commercially available visualization software package can be used as asserted by Applicant in lines 1-2, page 15 of the specification.

14-4. Applicant's argument (5) is unpersuasive. Partyka et al. have disclosed, "the tuning thickness depends only on the dominant wavelength of the wavelet" and provide related formulas in column 6, lines 24-28. Applicant also asserts, "the thickness estimate is calculated in step 38 using the standard formula, known to those of ordinary skill in the art", in lines 20-23, page 13 of the specification. To display the bed thickness, at least, a commercially available visualization software package can be used as asserted by Applicant in lines 1-2, page 15 of the specification.

Conclusion

15. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

16. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Herng-der Day whose telephone number is (703) 305-5269. The Examiner can normally be reached on 9:00 - 17:30.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Kevin J Teska can be reached on (703) 305-9704. The fax phone numbers for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Herng-der Day
April 16, 2004

HUGH JONES Ph.D
PRIMARY PATENT EXAMINER
TECHNOLOGY CENTER 2100